

IES

Newsletter

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Director's Note

As a research and education institution, the Institute of Ecosystem Studies values the exchange of resources and information with like organizations. Here in the mid-Hudson Valley we are fortunate to be in close proximity to a number of institutes of higher learning, and we welcome opportunities to interact with scientists, students and educators, and to share facilities.

One institution with which we have a long-standing relationship is Bard College. IES ecologists studying the Hudson River receive logistical support and site access from Bard's Field Station. Educators from Bard have taught IES Continuing Education Program Workshops, and Bard students have participated in our Research Experiences for Undergraduates program and worked as research assistants in IES laboratories.

This issue of the IES Newsletter describes two other collaborative efforts with Bard College: research by Dr. Erik Kiviat as a Cary Summer Fellow, and the Liberty Environmental Science Academy, based at Bard with a science curriculum developed by Institute educators.

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Allan Burliner Photography

Dr. Gene E. Likens receives the gold medal of the Tyler Prize for Environmental Achievement from Dr. F. Sherwood Rowland, past Tyler Prize laureate and Donald Bren Professor of Chemistry at the University of California at Irvine. To the right is co-recipient Dr. F. Herbert Bormann.

Dr. Likens Receives Tyler Prize

Sometimes described as the "Nobel Prize for ecology", the Tyler Prize for Environmental Achievement is widely recognized as the most prestigious environmental award in the world. Early in December, at a ceremony in Los Angeles, Institute of Ecosystem Studies Director Dr. Gene E. Likens was awarded the 1993 Tyler Prize. The prize, shared with Dr. F. Herbert Bormann, Oastler Professor of Forest Ecology, Emeritus, Yale University, recognizes more than three decades of pioneering ecological research with the Hubbard Brook Ecosystem Study in New Hampshire.

Thirty years ago, Dr. Likens, Dr. Bormann and colleagues asked whether chemical analysis of stream water passing through a forest ecosystem would provide clues to the "health" of the surrounding environment. To answer this question, the scientists chose a parcel of White Mountain National Forest, the Hubbard Brook Experimental Forest in West Thornton, New Hampshire, where everything flowing in to and out of the watershed could be measured and recorded precisely. They were joined in these efforts by Dr. Robert S. Pierce (U.S. Forest Service, now deceased) and Dr. Noye M. Johnson (Dartmouth College, now deceased). They named this new whole-ecosystem research program for its site, and scientists at the Hubbard Brook Ecosystem

Study (HBES) have produced some 1275 scientific publications and reports and four books since 1963. (See the July - August 1993 issue of the IES Newsletter for more on the HBES.)

In awarding the Tyler Prize for Environmental Achievement to Dr. Likens and Dr. Bormann, the Tyler Prize Executive Committee honored their creation of the premier model for ecosystem studies in the world. The prize also recognizes the scientists' record of innovative scientific leadership that has stretched the boundaries of environmental knowledge through discoveries that have changed American law and international policy.

Dr. Ray T. Oglesby, Professor of Natural Resources at Cornell University and a former faculty colleague of Dr. Likens at Cornell, said this honor is richly deserved. "Gene Likens and his colleagues have done extremely important research to help fellow scientists and policy-makers understand and tackle real problems. It is not an overstatement to say that they have done more for applied ecology than any group in science. Given the present state of Earth's environment and the predictions of things to come, that is an accomplishment to be very, very proud of."

continued on page 2

Tyler Prize, from page 1

Drs. Likens and Bormann discovered the first evidence of acid rain in North America while studying precipitation chemistry at Hubbard Brook. Their findings prompted the first international symposium on acid rain, contributed to the understanding that acid rain was a world-wide phenomenon, and resulted in intensive studies of the causes, transport and effects of acid rain in the United States and Canada. Dr. Likens continues to do research at Hubbard Brook, and this summer began a study of the environmental fate of the chemicals that are replacing chlorofluorocarbons as aerosol propellants and refrigerants. Chlorofluorocarbons are responsible for depleting ozone in the stratosphere and are being phased out according to intergovernmental accords. Until Dr. Likens' study, no research had been done on potential effects of their replacement chemicals on natural forest ecosystems.

The Tyler Prize for Environmental Achievement was established in 1973 by Alice Christine Tyler, a leading Los Angeles philanthropist, and her husband John Cummings Tyler to honor scientists whose work distinguishes them as "guardians of the future". To date, 33 laureates have been recognized for their outstanding achievements in environmentally related fields that include chemical ecology, species diversity, water quality, atmospheric chemistry and the protection of the Earth's atmosphere, oceanography and renewable sources of energy. The Tyler Prize is presented annually and includes a \$150,000 award. Tyler laureates are selected by a committee composed of top scientists, politicians and leaders from the corporate sector.

The events of the Tyler Prize presentation began with live radio interviews on CBS and Voice of America, telephone interviews with newspaper reporters from across the United States, and an appearance on "Eco-News", a syndicated cable television program. The Tyler Prize gold medal was presented on Friday evening, December 3, at the Four Seasons Hotel in Los Angeles. Guests at the dinner included the Tyler Prize executive committee, friends and colleagues of Mrs. Tyler, members of the

(especially in the tropics), toxification of the biosphere, invasions of exotic species (such as the zebra mussel in this region), and loss of species. Quoting a colleague, he said that "ecology must be made a part of the decision-making checkerboard, not just one of the checkers that can be moved around at the whim of some politician", and cited acid rain and the commercial exploitation and depletion of marine fish resources as examples where application of ecological principles could lead to more effective

management. In conclusion, he listed six things that can be done to reverse the problems of human-accelerated environmental change:

1. Scientists must disseminate new findings and then work to make them clear and understandable to the public and decision-makers. Uncertainties must be clear and understood.

"I know how dangerous it is to quote Larry Bird here in 'Laker-land', but I am very fond of what he said last February when he retired from the Celtics basketball team: '... you can't try to win awards. You just have to play your game and try to help your team win. If you do it well enough, the awards will just come' (USA Today, 3 February 1993). We have a great team at Hubbard Brook."

— Dr. Gene E. Likens, at the Tyler Prize presentation in Los Angeles, thanking the many whose work and support contributed to his receiving this award for environmental achievement.

Los Angeles community, and family and friends of the recipients. A highlight for Dr. Likens was that all members of his immediate family — Phyllis Likens, his wife, who is executive secretary of the HBES, his son and three daughters, his mother and his brother — were there to share the evening with him.

In his acceptance address, Dr. Likens expressed pride that the Tyler Committee had chosen to honor the field of ecology. "Because of its fundamentally integrative nature, ecology has great potential for generating broad understanding about complex natural phenomena," he said. "Human-accelerated environmental change" is the term that Dr. Likens has given to the assaults to our global ecosystem that include acid rain, stratospheric ozone depletion, climate change, deforestation

2. Politicians must provide leadership and form partnerships with the public to make it easier for individuals to accept responsibility about environmental issues.
3. Students must learn more about environmental issues and ethics.
4. Teachers must provide a balanced discussion of environmental issues. We need more course offerings about the relationship between ethics and the environment, and about the multidisciplinary nature of environmental problems, and there should be requirements for students to take these courses.
5. Individuals must accept responsibility for their part in environmental problems, and take time to learn about their environment.
6. Reporters and editors must take the time to get it right.

The Ecology of Blanding's Turtles

During 1993, Cary Summer Fellowships were awarded to Dr. Marie-Josée Fortin and Dr. Erik Kiviat. The research of Dr. Fortin, a post-doctoral scientist at the Centre D'Études Nordiques, Université Laval, Quebec, was summarized in the September-October issue of the newsletter. Dr. Kiviat studied the Blanding's turtle.

For Dr. Erik Kiviat, associate professor of environmental studies at Bard College, Annandale, N.Y. and executive director of Hudsonia*, the Hudson Valley is his classroom and laboratory, and the threatened Blanding's turtles in Dutchess County are his favorite subjects. This year, as a Cary Summer Fellow, he combined this

long-term research interest with the biogeochemical studies of IES microbial ecologist Dr. Peter M. Groffman to investigate the relationship between Blanding's turtles and their habitats.

Blanding's turtles are shy creatures, but when they emerge to bask in the sun they are identified easily by a bright yellow chin and throat. Adults grow to approximately

25 cm (10 in.) and weigh almost 1 kilogram (about 2 lbs). The reptiles' range is from Nebraska to Nova Scotia, but east of Ohio populations are spotty: northern New York along the St. Lawrence River, northeastern Massachusetts and the adjacent corners of New Hampshire and Maine, southern Nova Scotia ... and Dutchess County. Blanding's turtles live in small wetlands, close to a pond or lake that provides refuge in times of drought and generally within a kilometer (0.6 mile) of a sunny site with well-drained, coarse-textured soil in which females lay their eggs. The turtles eat insects, snails, tadpoles, small clams, fish and probably some plants, all creatures that owe their existence to the wetland ecosystem.

* *Hudsonia is a non-profit institution for research, education and technical assistance in the environmental sciences, with offices at the Bard College Field Station.*

Blanding's Turtles, *continued*



Tom Taft

IES Cary Summer Fellow Dr. Erik Kiviatt sampled vegetation in Blanding's turtle habitats

In 1983 the New York State Department of Environmental Conservation declared the Blanding's turtle a threatened species in New York. A number of factors brought the turtles to such low population levels. A significant number is run over by cars and farm machinery each spring as they move from one wetland to another and to the fields, yards and gardens where they lay their eggs. Raccoon predation also is believed to be a limiting factor, as is the mortality that results when children collect the turtles as "pets", then (assuming that the animals survive) release them in unsuitable habitats.

Loss and degradation of wetland habitats, however, are the principal reasons for the reptile's threatened status. Not only are these areas increasingly being filled or drained, but the nature of even untouched wetlands puts these ecosystems at risk: wetlands receive materials from the surrounding landscapes and therefore tend to accumulate pollutants — excess nutrients, toxic substances and silt. In Dutchess County, most of the pollutants and silt come from runoff from dumps and farmlands; from fertilizers, pesticides and household chemicals that leach from home septic systems; and from the construction that accompanies suburbanization.

How do the chemistry and function of the Blanding's turtle's ecosystem change as a result of outside influences such as increased nutrients? That question formed the basis of the summer 1993 collaboration between Drs. Kiviatt and Groffman. Of the 10 known Blanding's turtle sites in Dutchess County, Dr. Kiviatt selected five in Clinton, Hyde Park and LaGrange that have all three of the preferred habitats: wetland, lake or pond, and dry nesting area. He did his sampling just in the spring habitats, the wetlands.

The best Blanding's turtle habitats in this area seem to be the wetlands of small deep glacial kettles — pits perhaps created by chunks of glacial ice — with abundant buttonbush, a shrub that is well-adapted for a wet habitat and whose dense growth provides refuge for the turtles. In 1979 Dr. Kiviatt began censusing turtle populations, and he is continuing to add to this data base at his current study sites. With a special permit from the DEC, he captures turtles and photographs them for a permanent record based upon the shell pattern. Before releasing them where he found them, he records size, weight and sex, notes any injuries or external parasites, then glues a tag with an identification number to the shell. During the past summer, Dr. Kiviatt examined the general nature of the turtles' habitats as well, doing a vegetation analysis to determine the structure of the habitat, listing all plant species and recording their relative abundance, and sampling the soils.

Overenrichment by nitrogen, a nutrient, can change habitats drastically and be harmful to resident animals and plants. When

nitrogen enters the ecosystem from fertilizers, sewage and atmospheric deposition, it can be transported in surface water or by groundwater to wetlands and lakes. In Dr. Groffman's laboratory at the IES Plant Science Building, soil samples from each of Dr. Kiviatt's turtle sites were analyzed for nitrogenous compounds. Drs. Kiviatt and Groffman hope to find if increased nitrogen degrades Blanding's turtle habitats, and if there are fewer turtles in habitats with high nitrogen levels. By tracking chemicals through the ecosystem they will be able to assess the impact of human activity on the turtles.

Dr. Kiviatt will continue the research he began as a Cary Summer Fellow, learning more about the turtles' springtime wetland habitats and the land use on adjacent properties. His goal is to study the relationships between the landscape, biogeochemistry, soils, water, vegetation, food and the turtles. Perhaps eventually the Blanding's turtles of Dutchess County will help humans understand the intricacies of wetlands on a much larger scale.

Reaching Out to Young Scientists

The Liberty Environmental Science Academy (LESA), a joint program of Bank Street College of Education (New York City), Bard College (Annandale, N.Y.) and IES, serves students who are among those least likely to pursue careers in mathematics and science. In 1993, 60 African-American and Latino students from secondary schools in Community District Three in Manhattan spent two weeks at Bard in an integrated academic program of science and writing activities. Students in grades 7-9 studied forest ecology, learning about local plants and animals and their interactions with each other and the non-living environment, while those in grades

10-12 used quantitative techniques to do experimental and comparative studies and applied problem solving in ecology.

Kass Hogan, IES educational research and development specialist, is the LESA science program coordinator. She works closely with educators at Bank Street and Bard to develop the science curriculum and oversee its implementation. Last summer, LESA students spent a day at the Institute working with IES Research Experiences for Undergraduates (REU) students (see the September - October issue of the IES Newsletter for an article on the 1993 REU program at the Institute).



Jill Cadwallader

1993 REU program participant Joel Brown, who compared exotic and native plant species in old fields, demonstrates field research techniques to a group of LESA students.

Calendar

CONTINUING EDUCATION

Certificate in Natural Science Illustration

A new Certificate in Natural Science Illustration is being offered by the Institute. This certificate is for students interested in professional illustration work as well as for those who want to learn to draw for pleasure. Upcoming classes are:

- Pen and Ink I
- Pen and Ink II
- Botanical Watercolor Illustration
- Outdoor Sketching
- Colored Pencil Illustration

Catalogues listing winter and spring semester classes, workshops and excursions — 50 in all — are available from the Gifford House. Winter semester highlights include:

Jan. 29: **The Hows of Houseplants**
Feb. 5: **Gardens for Dry Sites and Dry Years**
Feb. 12: **The Landscape with Perennials in the Mixed Border** (workshop)
Feb. 26: **Planting the Seeds for Your New Business** (workshop)
Mar. 5: **Designing a Flower Garden** (workshop)
Mar. 9: **Philadelphia Flower Show** (excursion)
Mar. 19: **Raised Bed Vegetable Gardening**
Mar. 19: **Ecological Landscape Assessment** (workshop)

The IES Continuing Education Program office has a new telephone number. Call 914/677-9643 for information on certificate programs or individual offerings, or to register.

SUNDAY ECOLOGY PROGRAMS

Free public programs are held on the first and third Sunday of each month, except over holiday weekends. Programs begin at 2 p.m. at the Gifford House on Route 44A unless otherwise noted. Last-minute schedule changes are sometimes unavoidable, so call 914/677-5359 to confirm the day's topic.

For general information, call the IES Education Program Office at the Gifford House Visitor and Education Center: 914/677-5359 weekdays from 8:30 - 4:30.

Sunday Ecology Programs, continued:

Feb. 6: **Research at the Institute of Ecosystem Studies**, a slide presentation by Dr. Gene E. Likens
Feb. 20: President's Day weekend, no program
Mar. 6: to be announced
Mar. 20: **Coral Reefs of the Bay Islands of Honduras**, a slide presentation by Dr. Nina Caraco

• *In case of poor weather, call 677-5358 after 1 p.m. to learn the status of the day's program. For outdoor programs, wear long pants tucked into socks and sturdy waterproof shoes.*

IES SEMINARS

The Institute's program of **scientific seminars** features presentations by visiting scientists. These free seminars are held each Friday at 3:30 p.m. in the Plant Science Building. Last-minute schedule changes are sometimes unavoidable, so call 914/677-5343 to confirm the day's topic.

Jan. 14: **Mechanisms of Coexistence of Optimal Foragers: Temporal Partitioning in Two Species of Gerbils**, Dr. Burt Kotler, Mitrani Center for Desert Ecology, Israel
Jan. 21: **The Role of Surface Waters in Landscape Level Carbon Dioxide Dynamics**, Dr. Tim Kratz, Univ. of Wisconsin
Jan. 28: **Nitrogen vs. Phosphorus Limitation in Coastal Marine Ecosystems: Evolution of a New Paradigm**, Dr. Robert W. Howarth, Cornell Univ.
Feb. 4: **Neighborhood Ecology Investigations for Urban Youth: A National Community-Based Education Program**, Dr. Karen Hollweg, VINE Network, Washington D.C.
Feb. 11: (**Topic: G.E. Hutchinson**), Dr. Nancy Slack, Russell Sage College
Feb. 18: to be announced
Feb. 25: **The Blowdown Cycles of Southern Beech Forests in Tierra del Fuego**, Dr. Alan Rebertus, Univ. of Missouri

GREENHOUSE

The IES greenhouse is a year-round tropical plant paradise as well as a site for controlled environmental research. The greenhouse is open until 4:00 p.m. daily except public holidays. Admission is by free permit from the Gifford House.

GIFT SHOP

Senior Citizens Days: On Wednesdays, senior citizens receive a 10% discount (except sale items). **January "Month-Long Sale":** All regularly priced gifts discounted 20%, books discounted 10% and most holiday items discounted 50%.

HOURS

(Winter hours: October 1 - April 30; closed on public holidays)

Public attractions are open Mon. - Sat., 9 a.m. - 4 p.m. & Sun. 1 - 4 p.m.; trails and roadways are closed when snow-covered. **The Gift and Plant Shop** is open Mon.- Sat., 11 a.m. - 4 p.m. & Sun. 1 - 4 p.m. (The shop is closed weekdays from 1 - 1:30 p.m.)

• *All visitors must pick up a free permit at the Gifford House Visitor and Education Center on Route 44A for access to IES public attractions. Permits are available until 3:00 p.m. daily.*

MEMBERSHIP

Become a member of the Institute of Ecosystem Studies. Benefits include a member's rate for IES courses and excursions, a 10% discount on Gift Shop purchases, a free subscription to the IES Newsletter, and participation in a reciprocal admissions program, with benefits at over 100 nature centers, forest preserves, gardens and conservatories in the U.S. and Canada. Individual membership is \$30; family membership is \$40. For information on memberships, call Janice Claiborne at 914/677-5343.

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